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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/840,600	04/23/2001	Roger S. Tsai	12-1120	3792

7590

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EXAMINER

TRAN, THIEN F

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/840,600

Applicant(s)

TSAI, ROGER S.

Examiner

Thien F Tran

Art Unit

2811

-- Th MAILING DATE of this communication appears on the cover sheet with the corresponding address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☒ Claim(s) 13-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

Claims 1, 5, 9, 10 and 13 are objected to because of the following informalities:

Claim 1, line 2, "said semi conductor" should be --said semiconductor device—for proper antecedent basis.

Claim 5, line 4, "semiconductor" should be --semiconductor device—for proper antecedent basis.

Claim 9, line 1, "the" should be --an-- for proper antecedent basis.

Claim 10, line 1, "step (b)" should be --step (f)-- for proper antecedent basis.

Claim 13, line 3, "the active" should be --an active-- for proper antecedent basis; line 4, "the gate" should be --a gate-- for proper antecedent basis; line 7, "the velocity" should be --a velocity-- for proper antecedent basis .

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Mahon et al. ("A Technique for Modelling S-Parameters for HEMT Structures as a Function of Gate Bias", IEEE Transactions on Microwave Theory and Techniques, Vol. 40, No.7, July 1992).

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Mahon et al. disclose the claimed method of modeling a semiconductor device comprising the steps of modeling a small signal electrical equivalent circuit (Fig. 1) for the semiconductor device (HEMT device) which includes a plurality of electrical circuit elements defining a small signal model; and deriving the electrical circuit elements by using analytical empirical expressions to model the fundamental electric charge and field of the HEMT device.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahon et al. in view of Admitted prior art (prior art references in the application, pages 10).

Mahon as described above discloses analytically determining electrical permitivity, conduction band and material but does not explicitly disclose the step of analytically determining the relationships between the conducting band offsets, electrical permitivity and material composition. However, such relationships are well known in the art for modeling charge control characteristics of HEMT device as further disclosed in the applicant's specification (page 10) which states that the relationships could be obtained from various references. Therefore, including the well known step of

analytically determining the relationships between the conducting band offsets, electrical permittivity and material composition would have been obvious modification.

Regarding claim 7, Mahon et al. further discloses the step of fitting simulated data.

Claims 8-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Mahon et al. in view of Admitted prior art (APA) as applied to claims 5-7 above, and further in view of Hirose et al. (A Possible Scaling Limit for Enhancement-Mode GaAs MESFET's in DCFL Circuits", IEEE Transactions on Electron Devices, Vol. 39, No. 12, Dec. 1992).

The combined references as described above does not specifically disclose determining the electron transport characteristics of any bulk materials in the semiconductor, determining the undepleted linear channel mobility by material characterization or physical simulation, and determining the schottky barrier height expressions. However, such determinations are known in the art for modeling HEMT device as disclosed for example by Hirose et al. (sections II and III). Therefore, It would have been obvious to a person having ordinary skill in the art at the time the invention was made to further include the steps of determining the electron transport characteristics of any bulk materials in the semiconductor, determining the undepleted linear channel mobility by material characterization or physical simulation, and determining the schottky barrier height expressions as taught by Hirose et al. into the method of Mahon et al. in view of Admitted prior art in order to achieve higher speeds.

***Allowable Subject Matter***

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Claims 13-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Conclusion**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Therefore, Applicants are requested to consider them carefully in response to this office action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tt  
December 13, 2002



Thien Tran  
Patent Examiner  
Technology Center 2800